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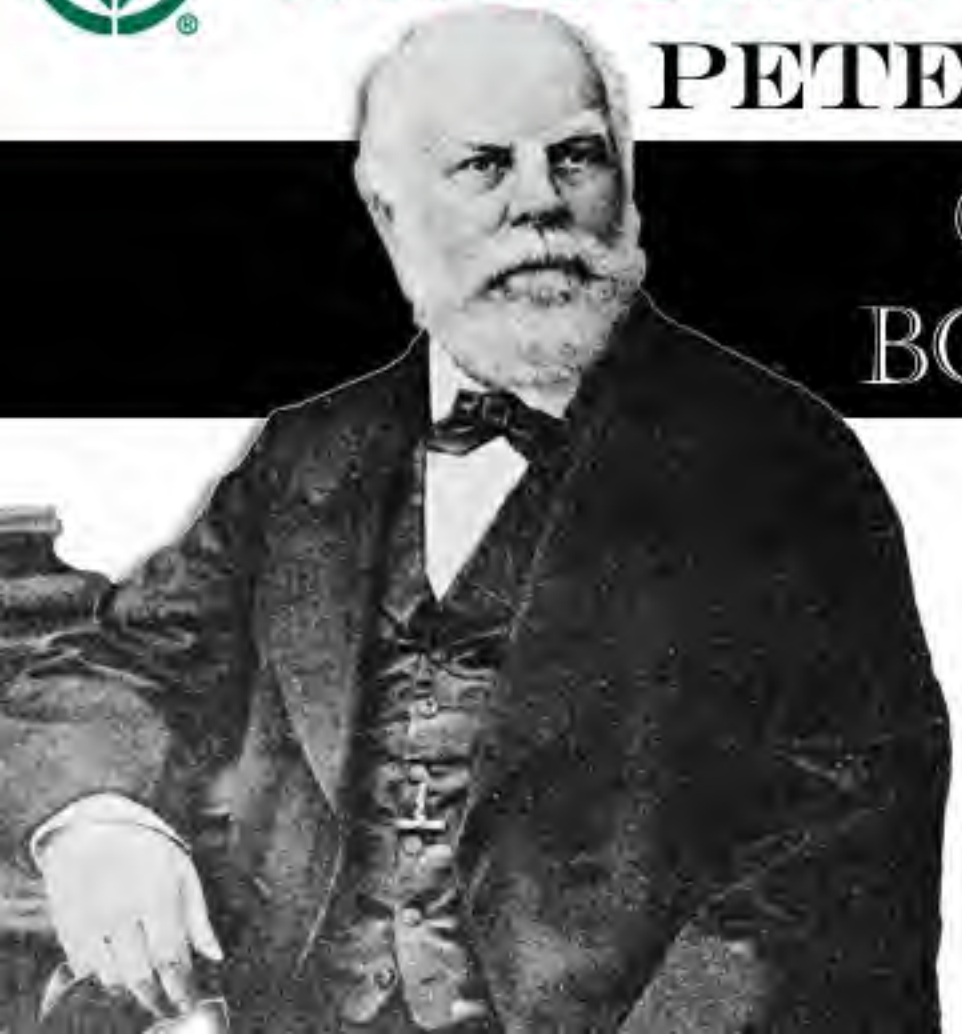

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Figure Agenda
♀
Aug. 1860

ovary & scales

ext palea long
aristate
5 nerved,
middle nerve indistinct
Marginal ones strong.
int. palea nerveless

female flower
back, showing the lateral nerves and
a little of the int. palea

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10327

M. W. ALEXANDER,

SOUTH-EAST CORNER OF FOURTH AND MARKET STREETS,

ST. LOUIS.

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Fijan aquatica

X30 Aug 1860

single hair of stigma

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ALEX. LEITCH,

APOTHECARY & PHARMACEUTIST,

Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.

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Tijuana agavaceae

♂

Aug 1960

ext petals
5 ribs
2 ribs
marginal

inter petals
3 ribs

scale

ext

int.

scale

sect of 6 stamens.

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SOUTH-EAST CORNER OF FOURTH AND MARKET STREETS,

ST. LOUIS.

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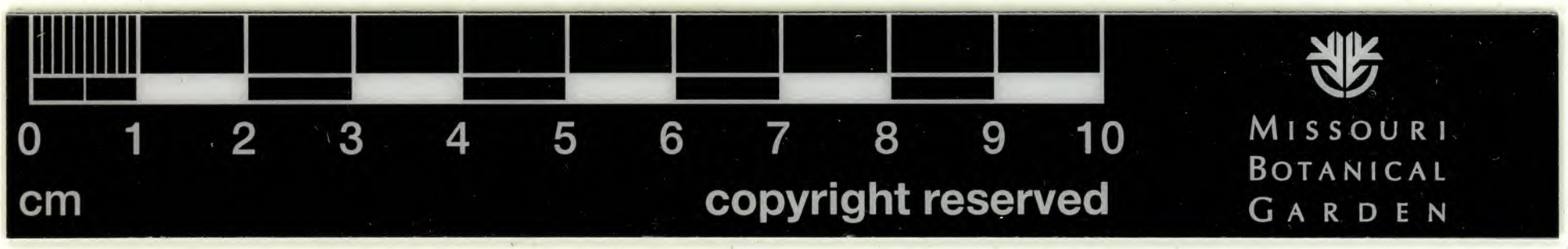

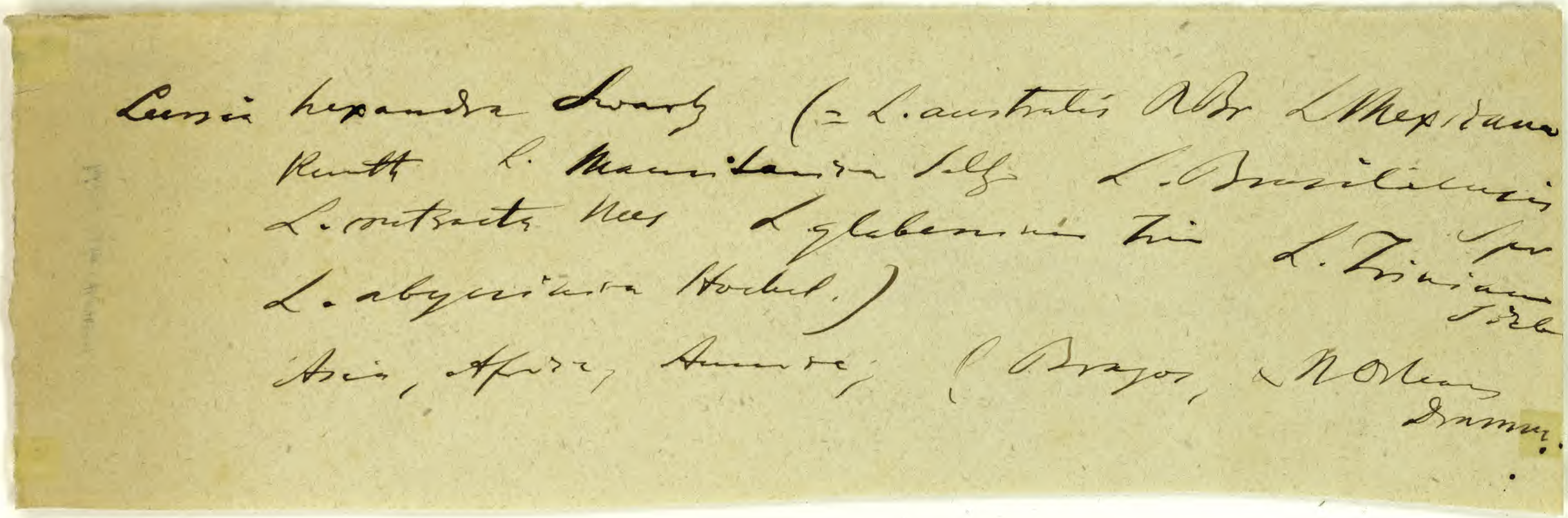

Cassia hepandra Swartz (= C. australis A.Rich. C. Mexicana Rudd. C. Marilandica Sibth. C. Brasiliensis C. corymbosa Mart. C. glabrescens Fres. C. Tora Spr. C. abyssinica Hochst.)

Asia, Africa, America (Brazil, New Orleans, Jamaica).

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Anoectochilus — Macromitrium

Cloanthes Rees MSS. in Herb. Hooker.

Divisa, flexibus mascr. plen. subconformibus

Spicula singula terminalis 3–4 flora structura maxime variabilis.

Flos infimus semper incompletus, e palea inferiore

fertilis solus aut inferior fertilis cum palea superiore

neutra; superiores 2–4 plerique completi, ovati, obtusi, concavi, basi cujusque connati; flos secundus sterilis rectus, plerique rectus, staminiferus; quartus et adest fere semper abortivus. Flosculi tubulosi elongati

Palea inferior flore staminifero ovato-lanceolata obtusa involuta, dorso convexa, multi (9–11) nervis, ochroleuca, enervis, apice subdenticulata

Palea superior acquetonga 1. paulo longior, obtusa, dorso convexa, involuta

Squamulae nullae

Stamina tria, antheris (profunde bilobis utrinque) filamentis longioribus vix exsertis.

Ovarii rudimenta nulla.

Flos fertilis unicus, spicula fusiformi ovalis, flores 2 plerique (juniores) sterilis et superiores fertiles

Flos sterilis rudimentalis

Palea inferior mucronata, palea superior neutra

Squamulae nullae

Stamina 3 rudimentalia

Ovarii rudimentum lanceolato-liberum (trigonum) obtusiusculum

Stylus exsertus apice contactus bifidus

Ovarium 4 ovulis erectis, funiculis — ipso — accretis, stigmata ex floris apice egredientibus, stylos duplo longiora, foliis simplicibus, plicatis.

Caryopsis libera linearis, triangularis.

Gramen perenne glaberrimum, culmis erectis
Mexicana, foliis planis, spiculis arcuatis, inaequalem, panicula
stolonifera, ramis plurimis, spiculis
foliosa glabris nitens, paucispiculatis.

Nomen gratae gramen floribus (Specifico)
Singulis gaudens

Bouteloua littoralis n. sp. perennis,
stolonifera, ramosa, culmis, glaberrima,
foliis brevibus, spiculis
paucispiculatis. apice cartilagineis, Typus ad nimos pubentes, margine ciliolatis
spicatis in apice caulis solitariis. dentatis

This singular grass has been sent by Drummond
from Texas by Berlandier (№ 3227) from the
region of Matamoras (Mouth of the Rio Grande?)
by Blodgett from Key west, Florida, and
by Lindheimer collected it in flower —
May on the Coast of Galveston Texas where
it covers large tracts of wet sandy salt prairie land.

It is distinguished from all the grasses
by the single spikelets on top of the end
of the stems and branches, in which a complete
transition is observed from the leafy to the
naked, without the intervention of regular
glumes — flowers perfect, 4 to 5 — and those of similar size to
set male — perfect, 4 to 5 — inches high, much
The stems are tufted and roots
branched, creeping, leaves
barely more than 2 lines = length very nearly
smooth = permanent = water worthy
the ends of the stems and on the
short branches which are 4-6 C. G.,
branches and the terminations of the stems, studded
the great number of spikelets, terminal, enveloped with
Similar
or glumes, spikelets, terminal, enveloped with
upper leaves, but destitute of proper glumes,
These upper leaves all bear more or less developed

axillary productions till one just below or opposite to the lowest flower ~~that~~ is found without such a branch or bud — it axils, but has yet the form of the other leaves, and might be taken for one of them or for a glume if it did not. The include a bract scale which can not be any thing but an upper palea, and which therefore shows us that as the lower palea of the lower always ~~that~~ neutral flower. It can not be supposed that a glume is wanting or abortive as we often follow the regular succession of bract-bearing leaves to this lowest flower ~~and~~ or palea. The upper palea of this neuter flower is variably shaped ~~in its~~, extending ~~sometimes~~ it is as far as the lower palea, (shorter or longer than the bract sheathing the lower palea) or larger nerveless scale, flat or reflexed, small obtuse or colored or sometimes divided into two completely separate parts which are placed side by side and which ~~sometimes~~ laterally protect the ~~sides~~ of the skeleton one ~~are~~ placed ~~on~~ within the other, ~~they~~ are usually smaller than the other; ~~the~~ The upper palea may be wanting. In a single instance only have I found this lowest flower more like the other — the lower palea with a shorter herbaceous rusp and the upper one 2 nerved and similar to those of the other flowers but yet ~~sterile~~ neutral.

The second flower opposite the last one, is stipitate, and is usually perfect, ~~viz~~ (stamens or pistillate) ~~the~~ ~~or~~ ~~neutral~~ ~~separate~~ and either with a small lobeless lower palea or ~~without~~ ~~separate~~ ~~in the~~ ~~other~~ flowers; ~~the~~ with palea small the more often it is reduced to a single palea which is either herbaceous or membranous or it is a single nerveless it was almost entirely suppressed, ~~the~~ ~~third~~ flower appears above and on the same side as the ~~last~~ lowest one appears to be the second ~~all that is left of the two~~ ~~the~~ The rare case when two single empty paleae is ~~also~~ stipitate and is usually well developed but sometimes often in female the male plants) It is not to be considered two small pistillate ~~flowers~~ ~~approaches~~ neuter to the regular stamen # bisexual flowers, then palea may ~~be~~ be round or glumes and gran

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dioecious plants I have never seen more than 2 perfect flowers, and very rarely a rudiment of a fourth flower; in male plants there are always 2 and often 3 staminate flowers, both developed usually with an ~~and~~ ovary and ~~4th flower rudimentary~~ upper rudimentary flowers.

The spikelet therefore is destitute of glumes and consists of 2—5 flowers of which always the ~~two~~ lowest 2 abortive and almost always the upper most are sterile aristate or rudimentary, and of which 1 to 3 of the middle ones bear stamens or pistils.

The spikelets are linear 3 & 4 l. long (with the awns) and ~~consist~~ of the lowest flower which is longer than the spikelet all the other flowers

The lower palea of the lowest staminate flower and pistillate flowers and envelopes not only the upper palea but also the base of the upper flowers and thus the ~~lower~~ upper palea is ~~not~~ visible only when the lowest flower is removed. The upper palea is a little longer than the lower one, especially in the male flowers. It is also obtuse and 1 nerved at top, and closely envelops the genital organs. In the male flowers it has two distinct carinae on the back, which with the upper palea envelope the upper flowers, as it distinctly exhibits in the diagram. Stamens 3, rarely longer than the palea, anthers deeply bilobed at both ends, linear. ~~Ovary~~ Pistil ~~has~~ a small bulbous base, persistent ~~base~~ style 2 cleft, stigmas 2 rather short.

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In the pistillate flowers 3 ~~minute~~ triangular fleshy organs ~~are~~ seem to represent the stamens, the style ~~is~~ short, trifacial with one angle towards the upper and the 2 others towards the carinae of the lower palea; it is deeply

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2 biff. the lobes terminating into straight awns ~~stamens~~ styles. The feathery stigmata consist of a simple scarcely dentate hair. —

systematic

The position of this grass is certainly a doubtful one, and the opinion which I venture to offer may seem paradoxical — that it is allied to the ~~Chloridae~~ Chlorideae — a tribe principally distinguished by its ~~spikelets~~ spikelets one-sided spikes! It seems to be the most reduced form of ~~Chlorideae~~ this tribe, where the spikelet only is left of the one-sided spike. Then it gets near the scarcely creeping Cynodon & near those ~~scarcely located~~ other seaside grasses, the Spartinas. The elongate feathery stigmata ~~hair~~ has run with this last with Buchloe and with other Chlorideae! If not to the Terminal position of the Rhachis with a Chloridae for which they certainly strive by the ~~Terminal~~ position of the Rhachis with a Pen to a tribe already designated by Koch — his Flora Jamaicensis, but nine neglected by Steud and others, and so well characterized by the spikelet flowers with elongate stigmata protruding from the apex of the flowers,

Happily we have an intermediate not quite so much reduced form as a Grass in Torrey's Beautifully established genus Munroa (Whipple Rotier).

Acc. A. A. Rep. IV p. 158), the old Cynosurus squarrosa & Nuttall

This is evidently a nearly allied grass with a spikelet only, on a terminal rhachis; but the obliquely oblong spikelet is not reduced the obliquely oblong spikelet

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characteristic of ~~this tribe~~ Chlorideae and which may be ~~fully~~ described in Buchloa. ~~The terminal spike~~ the terminal spikelet is more regularly formed or fig also the lateral spikelets of Bouteloua the stamens ~~also~~ protrude from the apex of the flowers as in other grasses have been stated. In Cloa there is only a single terminal spikelet, ~~left in the~~ analogous to the terminal spikelet of Munroa, which can not be obliged or one-sided.

The principal difference of Chlorideae and Munroa from the other Chlorideae consists in their ~~terminal~~ spikelets being terminal or arranged on a terminal rhachis while in Chlorideae proper they are disposed in lateral more or less digitate spikes. Of this difference should be deemed too important to take them into their alliance they must be classed with Leptochloa

see last page.

page 5: That the plant is distinct from Leptochloa has been already stated by Torrey (l.c. p. 154) by Nuttall himself pointed to its affinity (l.c. p. 65.) to Bouteloua Atheropogon or Chondrosium. The synonymy ~~of~~ That it is not an Atelepogon, nor pubiferous at all will be shown in the sequel. is evident from the description above given. The synonyms of the male plant, supplied through the kindness of Prof A Gray, are uncertain. the ~~names mentioned above~~ are uncertain as to the authors and not accompanied by any description or further notice. There seems to be a mistake as to Kunths name as no such name as Calamitheca or any Kunths writings, nor can I learn any thing about Rupprechts name. I have therefore proposed a new name and to prevent ~~any~~ a translation of the popular and widely known name of "Buffalograss" retaining of course Nuttalls original specific appellation.

It is well known that most grasses have hermaphrodite flowers, but that many of the have a tendency to a separation of the sexes, and that polygamous flowers are common among them grasses. Of the 28 genera of grasses about 200 flowers are noticed with monoecious flowers and a small heteromorphous

Nine monotypic genera constitute about 1/12 of the number of grasses only about 75 or 80 species, about 1/75 of the whole number of grasses at present known about Boston.

Of these genera two genera only are well known to the pastures Spinifex Lin, with 6 species for the East Indies and Australia, which known is not properly dioecious, being on a plant stamens and a on the other hemphrodite flowers and the anomalous genera Gymnocarpus Hund. Dop. &c. with 5 South American species. Some other dioecious grasses are noticed in the book as Calamagrostis Dodonaea Lam. Guadua Dioica Humb. and a few other doubtful ones.

It is not generally known that among our native grasses both species of Arundo pepper, one from the east seacoast the other from the saline soils of the western region in Utah are dioecious; the Spikes similarly constructed but the staminate plets readily distinguished by them the pistillate ones by their smaller growth, the spikes being more slender than the leaves, while the pistillate plant the culm are much longer than the spikes. Engelmann's replacing is also frequently or mostly dioecious the other species of Engelmann's seem to be imperfectly

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Ver monoica? grass mostly belg. to Oryzeae, Phalarideae, Paniceae & Aristideae
have been
none as yet known any Stipeae, Agrostideae
Aveneae, Festuceae,
Chlorideae, Hordeae

They differ unknown — Except with Zea in northern tropics Zea, with the exception of Tripsacum & Euchlaena
of North America — all with [illegible] the stamens & pistils.
We have to add Zea to the borders grass
the above notes. northern — Tripsacum & Euchlaena
the two following except genera now for the first
characters

Expl. pl.

1. A female plant — flowers.
2 Q. top of the stem with branches — a fem. spikelet
stamin. plant
3 1. spikelet consisting of the pale and flowers
4 2. single flower, open.
5 4 another staminate spikelet
natural / 3 & 4
6 5 a staminate spikelet
x this branch bears on the side towards the stem the bifid leaf (a) with a axillary branch with the usual
leaf (a) with a axillary branch with the usual
upper pales of the 2 lower pales (c.) less developed two (d.) lateral to the
flowers (both paleæ visible) 3 stamens flowers
7 5-6 Diagram of 2 lower spikelets with both paleæ
8 5-C. Diagram of the lower spikelets, 2 one
axe hidden by the cavity of the lower pales, 3 & 4
flowers reduced to a hypogynous scale, 5 & 6 rudimentary,
perfect stamens,
9 ZEA 1.C Diagram. of 2 pair of Bracteoles
(enlarged) of the upper pales of the lowest flower

pistillate
fem. spikelet
magnif.
plan exactly the same as that of the female spikelet
9. 1. C. Diagram of a flower
the lowest ♂ being empty
herbaceous lower pales
3 stamens and 2 empty flowers
corresponding to the
upper pales of the flowers.
the upper most
of the bifid leaf (a) with a axillary
branch with the usual
lateral to the
flowers (both paleæ visible) 3 stamens flowers

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2/ rhachis terminating the stem) and the heads are the 2 or 3 lateral oblique spikes, corresponding to the spikes of the male plant, in position & structure but being more contracted, & consisting of fewer (always 1 flowered) spikelets & being terminally obliquely upturned, while the male spikes turn obliquely downward. x/ The rhachis of these spikes (or heads) are finely grooved to the extension & have a cartilaginous or in fact almost chaffy substance, a pale straw colored, round smooth shining (at maturity) canal with a few scattered hair: at the insertion of each spikelet on the convex pedicle a tuft of short hair is noticed. —

x Where there are not more than 3 spikelets the head is subglobose, but when the number is larger the head is elongated & compressed, showing more distinctly the bi-serial arrangement.

The lower glume of the male plant is also The spikelets of the female turned so that the lower glume is outside the upper outside. The upper glumes consists of a small triangular or ovate obtuse or acuminate obscurely 3 ribbed ravinate scale, completely hiding in the cavity of the head. The upper glumes only the lower glume of the lowest spikelet is larger, with 2 or 3 pliferous points turned half outside and with its lower edge connate with the back of the only upper glume. The upper glumes are much larger broadly ovate, narrowed at base (& separated there for a distance by a round deep sinus) and terminating into 3 herbaceous nerved lanceolate linear points, a larger central and two smaller lateral ones, the upper glumes is of course opposite their upper glumes, and thus turned to the outside of the head.

The lower palea is much smaller, 3 nerved 3 pointed, with 2 further more lateral membranous ones extensions, enveloping the upper palea

The Upper palea is smaller 2 ravinate, membranously 2 pointed, - Scales similar to those

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of the male flowers.

Involucre of numerous slender bracts at the base of the short stipitate glandular ovary which terminates at the apex (supported) by two rather short styles and elongate stigmata protruding from the apex of the flowers. - Hairs of the stigma rather short simple and rather short.

Spikelet head thick valvose, extremely hard carlous the loose composite grain. Grain oval, abruptly obovate, flat on the outer side (turned towards the lower paler and concave side of the head) and convex on the inner face, with 2 indented pores pointed at the apex (with persistent bases of the style). Embryo on the flat outer side of the grain.

Each spike or head bears, with very rare exceptions at the upper end an involucre, consisting of a single sessile spikelet 2 - 3 - ported upper glumes. These with the similar looking lower glumes of the lowest spikelet seem at first glance to form an involucre for the head, or the cornate upper glumes have been called an involucre the lower glumes were overlooked and the plant placed with the paniceous Antephora which is closely allied to Cenchrus. It has been shown above that this view is based on a very superficial examination of our plant, and that the structure of the head is entirely analogous to that of the male spike of the Chloridaceous grass - general.

That the plant was - one hitherto a single monocotyledonous plant was found has been observed before, a figure of this indentity specimen is given on plate [illegible]

see last page

pl. XIII.

Explanation of Plate

1. a female plant (with stolons)
2. a larger and a smaller male stalk.
3. a specimen with a male and a female stalk from the same base collected at Fort Kearney by Mr Fendler.
4. a male spike in the position of the female spike at fig 5 to show the analogy of both.
5. Diagram of part of this spike, exhibiting the arrangement of the organs.
6. a spikelet seen from the outside of the spike;
7. the same spikelet from the lower glume to
8. the terminal spikelet of a spike, shewing a larger lower glume
9. flower with anthers stamens
10. Side view of the lower glume
11. do do of upper glume, c. with 2 nerves
12. lower palea
13. upper palea with the scales abutting

~~scales magnified~~

female flower

~~XIV~~

~~1. 2 female heads in flower, their natural position~~

1. do do. the involucral bracts. shewn back
2. ~~Diagram~~ of a head ~~with 3 fertile flowers~~
3. a female head with ~~6~~ fertile ~~florets~~
4. Diagram of the ~~a head of 3 fertile spikelets~~
5. sheaths ~~of a~~ shewing the insertion of 3 heads
6. lower & upper glume of lowest spikelet
7. one of the other spikelets shewing lower & upper glume and upper part of lower palea
8. lower glumes
9. lower palea

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~~10~~ ~~lower palea unfolded.~~ ~~fruit~~
~~24~~ ~~with the ovule, expanded.~~

10 ~~flower~~ ~~one~~ lower palea & fruit.

~~26~~ ~~lower palea & fruit outside~~

11 upper palea back, showing stigmata
12 ~~scales~~ as for the upper side
~~& fruit with the upper, showing also the scales.~~
13 ovary with rudimentary filaments, & the long style
& stigmata

14 ovary more magnified

15. a single stigmatose hair.
16 ventral section of fruit showing spikelet
17 grain; convex side, turned towards the upper palea

~~24 section~~ C. dorsal view

~~25 longitudinal section~~ ventral section.

After the words describing giving it as evident that Bouchloa ~~belongs to~~ can have nothing to do

XV

Cloantha

Hillia plant | last open showing
18. G. pistillate, ~~with~~ the lower flower with 2 palea
a second ~~female~~ pistillate ~~one~~, & the two
rudimentary ~~one~~

19 C. c. d'agrees.
~~#~~23 D. ~~A pistillate~~ from of the upper palea of the lower
flowers (neuter) arrangement,
20. ~~E~~ spikelet composed of an empty glume
the lower leaf, an empty 2nd glume, the lower
palea bifurcate at tip, a single pistillate
flower & a rudiment.

21
~~B.~~ C. Diagram of same

22
~~#~~8. D. Diagram of a ~~pistillate~~ lowest flower of 2 empty palea
~~upper palea of empty lower glume~~ this is the usual form of pistillate spikelet / of with the upper palea of lowest
9. Lower palea of a pistillate flower from the inside unfolded
10
11 upper palea of same outside showing the dilated
~~25~~ ~~MISSOURI BOTANICAL GARDEN~~ ~~GEORGE ENGELMANN PAPERS~~ unfolded
12
17

26 ~~#~~ ovary & pistillate
~~human~~ ~~magnified~~ ~~ovary~~
27 ~~#~~ hair of stigma

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